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10/594,068	12/26/2006	Hwa Yaw Tam	P71474US0	8875

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EXAMINER	
NGO, TANYA T	

ART UNIT	PAPER NUMBER
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/594,068	TAM ET AL.	
	Examiner	Art Unit	
	TANYA NGO	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 November 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 4-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 4-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/04/2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed Nov. 4, 2010 have been fully considered but they are not persuasive.

Re claims 1 and 16, the applicant argues that "the device disclosed in Tubel has inherent limitations that make it impossible to be applicable in a railway monitoring system" pg, 6 lines. The applicant goes on to further state that “the proposed technique in Tubel is not applicable to the to monitoring/measurement of operation conditions of the railway industry since typical measurement/response time using techniques mentioned by Tubel would take more than a minute to arrive at train location resolutions of tens of centimeter”, pg 8 and further goes on to describe how Tubel would not be proficient at measuring strain in a real time.

However, the reference of Varasi was used in combination with Tubel, wherein Varasi discloses “the use of optical sensors, made by fiber embedded Bragg grating method and by the use of a planar integrate optics device for the analysis of the optical signals. The sensors may be embedded or bonded to the structure, allowing the measurement of parameters like strain and temperature, in either a static of dynamic regime. The system pertains to the technical field of the diagnostics and measurements of mechanical or thermal parameters and to the application field of ground, water and aerospace transportation”, Abstract. Since it applies ground transportation, it also includes rail road system. Furthermore, it is disclosed that “one result of this invention is to make available a complete compact and integrated system suitable for the real time monitoring service strains on structures and components, with miniature characteristics and compatibility with the environmental conditions in which the structure of component may operate” col. 8, lines 17-22. since Varasi is able to monitor strain and temperature in real time, it does not suffer from delay.

Hence in view that the combination of Varasi and Tubel were used in combination, and Varasi discloses a fiber Bragg Grating that could be used in a railway application. It is clear that Varasi and Tubel in combination to do not teach away from using fiber Bragg grating for monitoring conditions in the railway.

Re claim 4, in response to applicant's argument that "the reasons for pre-straining the sensor is not to increase the detection sensitivity of the fiber Bragg grating sensors, but rather to inform the interrogating system whether the fiber Bragg grating sensors are firmly attached to the location of the location at which the fiber Bragg gratings are supposed to attach", the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Re claim 4, the applicant further argues that "without clear teaching prior art, it would not have been obvious to those skilled in the art to pre-strain the Bragg grating in the system of Tubel or Varasi so as to arrive at the invention of claim 4". However, Helmig (US PG PUB 2001/0022804) disclose a fiber Bragg grating written into a glass fiber which serves as a temperature sensor (Abstract). Furthermore, Fig. 4 of Helmig shows the temperature dependence of the temperature sensor of the invention in curve I by comparison with curve II which represents a reference measurement with a fiber Bragg grating which does not have a strain enhancement. The mean slope of the measurement curve for the temperature sensor of the invention is about is hither then the mean slop of the sensor without strain. The graph does show the increase sensitivity of the sensor according to the invention resulting from the superimposition of the strain effect on temperature variation ¶ [0036]. Hence, when the addition of strain results in increase sensitivity in the fiber Bragg grating sensor. Varasi and Helmig are analogous art because they both pertain to fiber Bragg grating sensors being used to measure a

parameter. It would have been obvious for one of ordinary skill in the art at the time when the invention, in view of Varasai and Helmig, to superimposed strain onto the fiber Bragg grating sensor of Helmig, in the sensors of Varasai because it is a known technique to improve a similar device. *MPEP 2143 KSR Rational C*

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1 and 4-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tubel (U.S. Patent Application Publication US 2003/0094281 A1) in view of Varasi et al. (U.S. Patent US 5,493,390).

Regarding claims 1 and 16, discloses a railway monitoring system (fig. 5), comprising:

an optical fiber (fig. 5, fiber 30), wherein a first part of the fiber is attachable to one of a pair of tracks of a rail, and wherein a characteristic of the first part of the fiber is variable in correspondence to variance of a characteristic of said one track where the first part of fiber is attached;

an optical signal emitter (fig. 5, 18a) connected to the fiber for emitting an optical signal into the fiber, wherein the fiber generates at least a first altered optical signal, which contains information relating to the variance of the characteristic of the part of the fiber; and

an optical signal analyzer (fig. 5, 18b) connected to the fiber for receiving and analyzing the first altered optical signal so as to ascertain the variance of said characteristic of said one track based upon the information contained in the first altered optical signal;

wherein both the emitter and the analyzer are connected to an end of the fiber;

wherein the first altered optical signal is a signal reflected by the fiber towards said end (fig. 5).

Tubel differs from the claimed invention in that Tubel does not specifically disclose that the first part of the fiber includes a first Bragg grating created therein for generating the first reflected optical signal, wherein a characteristic of the first Bragg grating is variable in correspondence to the variance of said characteristic of said one track, and wherein the first reflected optical signal contains information relating to the variance of the characteristic of the first Bragg grating. However, Tubel discloses that the fiber sensor can be a Bragg grating (paragraph 0077). Varasi discloses first part of the fiber includes a first Bragg grating *(optical fiber 2 includes Bragg grating sensors 3, Fig. 6)* created therein for generating the first reflected optical signal *(the first fiber sensor is formed within the optical fiber, wherein the sensor providing reflected light substantially at a reflection wavelength, Col 7, lines 39-42)*, wherein a characteristic of the first Bragg grating is variable in correspondence to the variance of said characteristic of said one track *(in using the Bragg grating sensor embedded in the structure, mechanical deformation of the structure such as elongation or a contraction cause a variation of the grating pitch and average index of refraction, and consequently a shift in the filter function of the optical grating filter, Col 3, line 65 – Col 4, line 6)*, and wherein the first reflected optical signal contains information relating to the variance of the characteristic of the first Bragg grating *(the reflection wavelength varying in response to a perturbation of the structure near where the sensor is attached, Col 7, lines 43-45)*. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention, in view of Tubel and Varasai, to incorporate Bragg grating sensors of Varasi, in the system of Tubel because modular sensors to provide in service monitoring of structures and components of railway, Col. 8, lines 30-52).

Regarding claim 4, the modified system of Tubel and Varasi differs from the claimed invention in that Tubel and Varasi do not specifically disclose that the first Bragg grating is pre-strained in a direction at least substantially parallel to said one track. However, Examiner takes Official Notice that it is well known in the art to pre-strain a Bragg grating utilized in a sensing device. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate to pre-strained the Bragg grating in the system of Tubel and Varasi in a direction at least substantially parallel to said one track. The motivation would have been to increase the detection sensitivity.

Regarding claim 5, the characteristic of the first Bragg grating in the modified system of Tubel and Varasi relates to a grating period of the first Bragg grating, and wherein the grating period is variable in correspondence to a change in a tensile strain that the first Bragg grating experiences (Varasi: figs. 1-10).

Regarding claim 6, Tubel and Varasi discloses that the first Bragg grating is attached to said one track such that the first Bragg grating experiences a same tensile strain as said one track (note that Tubel and Varasi disclose to bond the sensor to the measured structure, allowing the measurement of parameters like strain).

Regarding claim 7, Varasi discloses that the optical signal analyzer detects a shift in a wavelength of the first reflected optical signal for ascertaining the variance of the characteristic of the first Bragg grating (figs. 1-10).

Regarding claims 8-12, the modified system of Tubel and Varasi differs from the claimed invention in that Tubel and Varasi do not specifically disclose the specific ways of analyzing the measured data. However, the cited limitations are only trivial data analysis that is within the grasp of one of ordinary skill in the art. In addition, the cited limitations do not limit the system to any particular structures.

Regarding claim 13, Varasi further discloses that the system comprising a second Bragg grating.

Regarding claims 14 and 15, the modified system of Tubel and Varasi differs from the claimed invention in that Tubel and Varasi do not specifically disclose the specific ways of analyzing the measured data. However, the cited limitations only relate to trivial data analysis that is within the grasp of one of ordinary skill in the art. In addition, the cited limitations do not limit the system to any particular structures.

Regarding claim 17, Tubel further discloses that the information relates to train or vehicle on said rail (fig. 5).

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to TANYA NGO whose telephone number is (571) 270-7488. The examiner can normally be reached on M - F from 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngo/
December 1, 2010

/Kenneth N Vanderpuye/
Supervisory Patent Examiner, Art Unit 2613